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NOTICE OF ALLOWANCE AND FEE(S) DUE

2292 7590 08/11/2008

BIRCH STEWART KOLASCH & BIRCH
PO BOX 747
FALLS CHURCH, VA 22040-0747

EXAMINER

LE, TOAN M

ART UNIT

PAPER NUMBER

2863

DATE MAILED: 08/11/2008

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/572,568	01/16/2007	Roland Anderegg	2360-0444PUS1	8022
TITLE OF INVENTION: DETERMINATION OF SOIL STIFFNESS LEVELS				

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1440	\$300	\$0	\$1740	11/12/2008

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
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INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

2292 7590 08/11/2008

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Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/572,568	01/16/2007	Roland Anderegg	2360-0444PUS1	8022

TITLE OF INVENTION: DETERMINATION OF SOIL STIFFNESS LEVELS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1440	\$300	\$0	\$1740	11/12/2008

EXAMINER	ART UNIT	CLASS-SUBCLASS
LE, TOAN M	2863	702-002000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____
- (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____
- 3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies _____

4b. Payment of Fee(s); (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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10/572,568	01/16/2007	Roland Anderegg	2360-0444PUS1	8022
2292	7590	08/11/2008	EXAMINER	
BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747			LE, TOAN M	
			ART UNIT	PAPER NUMBER
			2863	
DATE MAILED: 08/11/2008				

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 0 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 0 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Notice of Allowability

Application No.

10/572,568

Examiner

TOAN M. LE

Applicant(s)

ANDEREGG ET AL.

Art Unit

2863

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 5/6/08.
2. ☒ The allowed claim(s) is/are 1-8 and 10-24.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some* c) ☐ None of the:
- ☒ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
- * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☒ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
- (b) ☒ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|--|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |

DETAILED ACTION

Drawings

The drawings are objected to because Figures 1, 2, 3, 4, & 5: lines, numbers, & letters not uniformly thick and well defined, clean, durable, and black (poor line quality), having crossing lines in Figures 4 & 5. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

EXAMINER’S AMENDMENT

An examiner’s amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

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Authorization for this examiner's amendment was given in a telephone interview with Paul Sewell on 7/31/08.

Please amend claim 1 as follows:

1. (Currently amended) A method for determination of soil stiffness levels of a soil area, whereas one and the same self-propelled apparatus (1) is used not only to determine the absolute soil stiffness level (k_B) when located on at least one predetermined soil subarea (3) of the soil area but also to determine a plurality of relative soil stiffness levels(s) while crossing over a plurality of soil subareas of the soil area, comprising:

in order to determine an absolute soil stiffness level (k_B), moving a vibration unit (5) of the apparatus (1) into a predetermined soil subarea (3), and a first time-variable excitation force being produced as a periodic first force with a maximum first oscillation level, which is directed at right angles (with the exception of an adjustment tolerance) against the soil surface, is applied by means of the vibration unit (5) in permanent contact with the soil surface, whereas the vibration unit (5) and the predetermined soil subarea (3) represent a single oscillating system, and first data items of a first oscillation response of the oscillating system and second data items of the first time-variable excitation force are determined, and an absolute soil stiffness level (k_B) of the predetermined soil subarea (3) is determined from the first and second data items; and

in order to determine a plurality of relative soil stiffness levels(s) of a plurality of soil subareas, moving the vibration unit (5) to the soil surface of one of the soil subarea of the soil area, whereas a second time-variable excitation force acts on the vibration unit (5) in such a way that the vibration unit (5) is lifted off the soil surface (2) and can thus be moved in a jumping manner to a plurality of the soil subarea, whereas

third data items representing a lowest subharmonic frequency of a second oscillation response of the oscillation of the vibration unit (5), caused by the second excitation force, and fourth data items representing the oscillation of the second excitation force are determined, and relative soil stiffness levels (k_B) of the soil subareas are determined successively and continuously over the soil area from the third and fourth data items.

Please amend claim 8 as following:

8. (Currently amended) An apparatus which propels itself on a soil surface for determination of soil stiffness levels of a soil area having a vibration unit being part of a so-called vibration plate, which can be moved into contact with the soil surface, whereas the vibration unit (5) can preferably also be used for soil compaction, comprising:

a vibration plate having a force production unit by means of which a periodic first excitation force and a second excitation force, which is not the same as the first and which act on the vibration unit (5), can be produced, whereas

the first excitation force can be adjusted by means of the force production unit in such a way that a maximum oscillation amplitude of the first excitation force can be directed at right angles against the soil surface, whereas the period of the first excitation force can be adjusted in such a way that resonance of an oscillating system formed from the vibration unit and a predetermined soil subarea of the soil area can be achieved, and the vibration unit (5) never loses contact with the soil subarea of the soil area under the influence of the first excitation force, and whereas

the second excitation frequency can be adjusted by means of the force production unit in such a way that the maximum oscillation amplitude of the second excitation force can be

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directed obliquely with respect to the soil surface and the excitation force is sufficiently large than the vibration unit loses soil contact in a jumping manner;

a measuring device with which oscillation data of the excitation force as well as oscillation data of the vibration unit can be determined as an oscillation response; and

an evaluation unit by means of which at least one absolute value of a soil stiffness of a predetermined soil subarea can be determined by means of the first excitation force from the oscillation data of the excitation force and the data of an oscillation response of the vibration unit (5), whereas a plurality of relative values of soil stiffnesses of predetermined soil subareas of the soil area can be determined by means of the second excitation force.

Please amended claim 22 as follows:

22. (Currently amended) A method for determination of soil stiffness levels of a soil area, in which case one and the same self-propelled apparatus (1) is used not only to determine the absolute soil stiffness level (k_B) when located on at least one predetermined soil subarea (3) of the soil area but also to determine a plurality of relative soil stiffness levels(s) while crossing over a plurality of soil subareas of the soil area, comprising:

moving a vibration unit (5) into a predetermined soil subarea (3), in order to determine an absolute soil stiffness level (k_B), a first time-variable excitation force is applied by means of the vibration unit (5) in permanent contact with the soil surface, whereas the vibration unit (5) and the predetermined soil subarea (3) represent a single oscillating system, and first data items of a first oscillation response of the oscillating system and second data items of the first time-variable excitation force are determined, and an absolute soil stiffness level (k_B) of the predetermined soil subarea (3) is determined from the first and second data items; and

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moving the vibration unit (5) to the soil surface of one of the soil subarea of the soil area, in order to determine a plurality of relative soil stiffness levels(s) of a plurality of soil subarea, a second time-variable excitation force acts on the vibration unit (5) in such a way that the vibration unit (5) is lifted off the soil surface (2) and can thus be moved in a jumping manner to a plurality of the soil subareas, third data items of a second oscillation response of the oscillation of the vibration unit (5), caused by the second excitation force, and fourth data items of the oscillation of the second excitation force are determined, and relative soil stiffness levels (k_B) of the soil subarea are determined successively and continuously over the soil area from the third and fourth data items, whereas

the amplitude of the first harmonic and of subharmonics during periodic excitation of the vibration unit (5) by the second excitation force are determined as third data items of the second oscillation response, preferably third data items are determined in soil subarea, which are located at different points, in a soil area together with the relevant absolute values, and are stored in order to carry out a calibration process which allows measured relative values to be represented as absolute values, whereas

the soil area has the same soil composition, except for a tolerance, the amplitude values of the third data items with respect to the maximum oscillation level of the excitation oscillation with individual weighting factors to be determined forming a sum, whereas the sum value is the respective location-specific absolute value, and the individual weighting factors are determined from a plurality of measurements, and whereas the numbers of measurements corresponds to the number of weighting factors, and the magnitude of the sum after a calibration process is a

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measure of an absolute soil compaction level or of an absolute soil stiffness of a soil subarea which is just been moved over.

Please amend claim 23 as follows:

23. (Currently amended) A method for determination of soil stiffness levels of a soil area, in which case one and the same self-propelled apparatus (1) is used not only to determine the absolute soil stiffness level (k_B) when located on at least one predetermined soil subarea (3) of the soil area but also to determine a plurality of relative soil stiffness levels(s) while crossing over a plurality of soil subareas of the soil area, comprising:

moving a vibration unit (5) into a predetermined soil subarea (3), in order to determine an absolute soil stiffness level (k_B), a first time-variable excitation force is applied by means of the vibration unit (5) in permanent contact with the soil surface, whereas the vibration unit (5) and the predetermined soil subarea (3) represent a single oscillating system, and first data items of a first oscillation response of the oscillating system and second data items of the first time-variable excitation force are determined, and an absolute soil stiffness level (k_B) of the predetermined soil subarea (3) is determined from the first and second data items; and

moving the vibration unit (5) to the soil surface of one of the soil subarea of the soil area, in order to determine a plurality of relative soil stiffness levels(s) of a plurality of soil subareas, a second time-variable excitation force acts on the vibration unit (5) in such a way that the vibration unit (5) is lifted off the soil surface (2) and can thus be moved in a jumping manner to a plurality of the soil subareas, third data items of a second oscillation response of the oscillation of the vibration unit (5), caused by the second excitation force, and fourth data items of the oscillation of the second excitation force are determined, and relative soil stiffness levels (k_B) of

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the soil subarea are determined successively and continuously over the soil area from the third and fourth data items, whereas

the first time-variable excitation force is produced as a periodic first force with a maximum first oscillation level, which is directed at right angles (with the exception of an adjustment tolerance) against the soil surface (2), and the periodicity is adjusted in such a manner that the oscillating system is at resonance, and the first and second data items include the resonant frequency and a phase angle between a time sequence of maximum oscillation values of the first excitation force and of the first oscillation response, whereas

the amplitude of the first harmonic and of subharmonics during periodic excitation of the vibration unit (5) by the second excitation force are determined as third data items of the second oscillation response, preferably third data items are determined in soil subareas, which are located at different points, in a soil area together with the relevant absolute values, and are stored in order to carry out a calibration process which allows measured relative values to be represented as absolute values, whereas

the soil area has the same soil composition, except for a tolerance, the amplitude values of the third data items with respect to the maximum oscillation level of the excitation oscillation with individual weighting factors to be determined forming a sum, whereas the sum value is the respective location-specific absolute value, and the individual weighting factors are determined from a plurality of measurements, and whereas the numbers of measurements corresponds to the number of weighting factors, and the magnitude of the sum after a calibration process is a measure of an absolute soil compaction level or of an absolute soil stiffness of a soil subarea which is just been moved over.

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Please amend claim 24 as follows:

24. (Currently amended) A method for determination of soil stiffness levels of a soil area, in which case one and the same self-propelled apparatus (1) is used not only to determine the absolute soil stiffness level (k_B) when located on at least one predetermined soil subarea (3) of the soil area but also to determine a plurality of relative soil stiffness levels(s) while crossing over a plurality of soil subareas of the soil area, comprising:

moving a vibration unit (5) into a predetermined soil subarea (3), in order to determine an absolute soil stiffness level (k_B), a first time-variable excitation force is applied by means of the vibration unit (5) in permanent contact with the soil surface, whereas the vibration unit (5) and the predetermined soil subarea (3) represent a single oscillating system, and first data items of a first oscillation response of the oscillating system and second data items of the first time-variable excitation force are determined, and an absolute soil stiffness level (k_B) of the predetermined soil subarea (3) is determined from the first and second data items; and

moving the vibration unit (5) to the soil surface of one of the soil subarea of the soil area, in order to determine a plurality of relative soil stiffness levels(s) of a plurality of soil subareas, a second time-variable excitation force acts on the vibration unit (5) in such a way that the vibration unit (5) is lifted off the soil surface (2) and can thus be moved in a jumping manner to a plurality of the soil subareas, third data items of a second oscillation response of the oscillation of the vibration unit (5), caused by the second excitation force, and fourth data items of the oscillation of the second excitation force are determined, and relative soil stiffness levels (k_B) of the soil subarea are determined successively and continuously over the soil area from the third and fourth data items, whereas

the second time-variable excitation force is produced with a second periodic force, the second force has a maximum oscillation level which is greater than a first maximum oscillation level of a first periodic force of the first excitation force in such a way that the vibration unit (5) is lifted off the soil surface (2), whereas

the second maximum oscillation level of the second periodic force is directed obliquely to the rear with respect to the vibration unit towards the soil surface (20, in order that the vibration unit (5) can be moved in the forward direction, and a lowest determined subharmonic frequency is determined, as the third data items of the second oscillation response, as a measure for a relative soil stiffness(s) with a relative soil stiffness(s) becoming greater, the lower of the lowest determined subharmonic oscillation is, whereas

the amplitude of the first harmonic and of subharmonics during periodic excitation of the vibration unit (5) by the second excitation force are determined as third data items of the second oscillation response, preferably third data items are determined in soil subarea, which are located at different points, in a soil area together with the relevant absolute values, and are stored in order to carry out a calibration process which allows measured relative values to be represented as absolute values, whereas

the soil area has the same soil composition, except for a tolerance, the amplitude values of the third data items with respect to the maximum oscillation level of the excitation oscillation with individual weighting factors to be determined forming a sum, whereas the sum value is the respective location-specific absolute value, and the individual weighting factors are determined from a plurality of measurements, and whereas the numbers of measurements corresponds to the number of weighting factors, and the magnitude of the sum after a calibration process is a

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measure of an absolute soil compaction level or of an absolute soil stiffness of a soil subarea which is just been moved over.

Allowable Subject Matter

Claims 1-8 and 10-24 are allowed.

Claims 1-8 and 10-24 are allowable over the prior art of record, none of the prior art whether together singularly or in combination to teach the claimed combination as recited. The closest reference No. 6,431,790 does not disclose or suggest the improvement of the instant application comprising: determining an absolute soil stiffness by a first time-variable excitation force with maximum first oscillation level deducing a first and second response data and determining a plurality of relative soil stiffness levels by a second time-variable excitation force such that the vibration unit is lifted off deducing a third and fourth response data representing a lowest subharmonic frequency; the first and second data are used to determine an absolute soil stiffness level while the third and fourth data are used to determine a plurality of relative soil stiffness levels as cited in independent claims 1, 22, 23, and 24; in addition, amplitude values of the third data items with respect to the maximum oscillation level of the excitation oscillation with individual weighting factors to be determined forming a sum, in which case the sum value is the respective location-specific absolute value, and the individual weighting factors are determined from a plurality of measurements, in which case the number of measurements corresponds to the number of weighting factors, and in which case the magnitude of the sum after a calibration process is a measure of an absolute soil compaction level or of an absolute soil stiffness of a soil subarea which is just been moved over as cited in claims 22, 23, and 24.

Reference '790 teaches Fourier analysis for soil stiffness when the applied apparatus maintains contact with the ground, lifts off the ground, or shows sign of jumping.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TOAN M. LE whose telephone number is (571)272-2276. The examiner can normally be reached on Monday through Friday from 9:00 A.M. to 5:30 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow can be reached on (571) 272-2269. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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